

**Remarks as prepared for delivery by
Ms. Tonya Wilkerson
Deputy Director, National Geospatial-Intelligence Agency
USGIF GEOINT Symposium 2022
GEOINT Fore word – “NGA and STEM”
April 24, 2022
Gaylord Rockies Resort & Convention Center
Aurora, Colorado**

Thanks for that kind introduction, Tara [Mott, NGA Account Manager, Esri]. Hello everyone! I am excited to have a conversation today with each of you about the intricacies, impact, and implementation of one of my favorite topics: Science, Technology, Engineering, and Math – STEM.

But before we get into it, I want to just say how wonderful it is to get to be here in Colorado, as we kick-start the 2022 GEOINT Symposium.

I know many of you were in St. Louis just a few months ago for the last symposium, and here we are again. I think that getting back to a springtime date for these great summits of geospatial talent is going to work out really well.

Even though we are only midway through what typically would have been a year-long buildup to the next event, so much has changed in our industry, and in the world.

I am honored to speak to all of you today as the Deputy Director of NGA, knowing that we have so many friends, partners, and innovators – leaders – who make up this community.

GEOINT professionals, like all of you, are incredibly unique and integral to the entire ecosystem that we work across. The effort, dedication and will to support each other is what makes this part of the IC so satisfying to work in, and lead. And we cannot do it, or sustain it, without a strategy to inject fresh talent and skill. As you may have heard from the CIA’s Jennifer Ewbank earlier today, the choice is simple: innovate or be left behind.

It’s fitting that we are here today on April 24, which happens to be the anniversary of a famous scientific achievement. On April 24, 1990, a new era in space exploration was born when the Hubble Space Telescope was launched into orbit. It marked a new era of space exploration, and opened the door to new ideas about capturing imagery.

So today, 32 years later to the day, I am excited to talk with all of you about how much we at NGA are deeply involved in several key aspects of STEM education and its advancement – for all of our future GEOINT leaders who will come from so many different diverse backgrounds.

NGA is at the intersection of all things STEM. Our research scientists, technology innovators, engineering experts, and math whizzes all collaborate to provide the world's best GEOINT to our partners, decision-makers, and warfighters – those who need the information to be sound, reliable, and available when they need it.

But GEOINT is more than NGA. It's all of you, too. And collectively, we have an opportunity to provide a boost to our future STEM pipeline.

Our campus recruitment strategy includes 12 colleges and universities that have a Geomatic focus, with three that are categorized as "large STEM schools": MIT, Georgia Tech and Purdue. But one area where we see a tremendous opportunity to shape the future is in our communities that are underrepresented in STEM.

One way we hope to shape our future is by reaching out to and establishing relationships with diversity-focused STEM professional organizations, including the Society of Women Engineers, the Society of Asian Scientists & Engineers, the Society of Hispanic Professional Engineers, and Out in STEM (or oSTEM). This can pay dividends in a number of ways, most importantly by making sure these organizations know what NGA does, and the opportunities we can provide.

For the same reasons, we take pride in engaging with Minority-Serving Institutions: Tribal Colleges and Universities, Asian American and Pacific Islander Serving Institutions, Historically Black Colleges and Universities, and Hispanic-Serving Institutions.

Frankly, we operate in an environment where NGA and GEOINT must have input from all of these communities – and others – in order to adapt to a changing world landscape. Without the perspective of all of us, we will fall behind. And we are determined not to fall behind. So we do our best to support our underserved communities in different ways, including outreach to various communities and populations.

Now before I get into how we are forming and nurturing a pipeline of talent, I want to give you a little background, from my perspective, on how and why STEM shaped Tonya Wilkerson.

I have always loved math and science, and as a high-schooler, decided that a good way to combine those interests was through pursuing a degree and career in engineering. It's important to note that I did not have a lot of insight into engineering as a career path, and despite living in the Washington Metropolitan area, had not really considered a career in the Intelligence Community.

So, you may be wondering how did I end up in the Intelligence Community? Well, through my high school principal, I was introduced to a CIA officer, who was looking to identify minority students interested in STEM to participate in the Stokes Undergraduate Scholar Program, designed to increase the number of minorities working in the Intelligence Community.

I headed off to Virginia Tech to study, and spent my summers working at CIA. While at Virginia Tech, I was introduced to the National Society of Black Engineers, a collegiate and professional organization whose mission is to increase the number of culturally Black engineers who excel academically, succeed professionally, and positively impact the community. NSBE provided a support system of similarly focused students.

Upon entering on duty, I was fortunate enough to be assigned to the NRO, and spent many years working the GEOINT mission – from research and development, to acquisition, systems engineering, and operations.

My path to STEM in the IC was definitely influenced by leaders just like you and me, who thought it important enough to invest time in seeking out an African American female student living in a rural area, just outside of Washington, D.C., who loved math and science and aspired to be an engineer. My personal experience has highlighted for me the importance of raising awareness of STEM and STEM careers to students across all ages and backgrounds.

More than 30 years later, I continue to be excited about this opportunity to serve in our community, and I pay it forward personally by continuing to engage in developing the next generation of STEM talent, as an advisor for a NSBE Jr. chapter, working with K-12 students.

At NGA, it is crucial and beneficial for our success as an agency to support, enhance and grow representation of STEM talent.

Some members of the next generation of GEOINT professionals are in elementary school today, with the future seemingly so far off for them. Some are in middle school, preparing for a science fair. And some are just now figuring out what they want to do after high school, as they fill out their first college applications.

For many, however, that's too late. Research shows that once a student makes it to college without a formed plan to pursue a STEM-based career, the likelihood of them actually doing so diminishes greatly. So getting these K-12 students engaged with STEM is crucial to what comes next in college.

But how are we seeing engagement in STEM grow at these younger ages, and how is NGA impacting that? And what happens when you factor in a community that is defined as underserved?

While many of our future STEM leaders who have been touched by the STEM bug are matriculating from top school districts across the country, including right here in the Denver area, many of them are beginning their STEM journey from schools in underserved communities.

Communities come in all different shapes and sizes – and locations and populations too. Kids from wide open rural locales can face the same type of accessibility issues to STEM products, support, and instruction as those who come from densely populated urban communities.

And we know that there are barriers that prevent many talented minds from all walks of life spanning racial, economic, and other communities from maximizing their potential. But for this particular part of my discussion, I would like draw upon what I have learned through my experience, working to grow the pipeline of diverse STEM talent, and talk specifically about what Black and African American children are often dealing with.

Research indicates that the STEM pipeline begins as early as kindergarten, where differences in the average test scores of different communities, including within Black and African American community, can already be seen. Think about that – five-year old African American children are already starting off their pathway behind the curve. How is that possible?

I know every underrepresented group is facing challenges, and needs to find a way to meet those challenges. One person whose work I find especially interesting in this regard is Dr. DeLean Tolbert Smith. Dr. Tolbert Smith is an Assistant Professor of Industrial and Manufacturing Systems Engineering at the University of Michigan's Dearborn campus. She's an engineer and active in NSBE, just like me. And also like me, she is highly motivated to find out some of the reasons why these deficits are happening, how to mitigate them and see more African American youth lean into STEM.

Last year, she was awarded a grant from the National Science Foundation to study STEM deficits in Black and African American youth. She is especially interested in looking at ways Black families are already acting as cultural assets.

I'm sure there is similar work going in other underrepresented communities; and if there isn't, there should be.

One big culprit she has found? She has found that many young Black children are not set up for success, due to a lack of exposure to STEM at a young age, which is often but not always due to their own families' lack of exposure to STEM, and so on down the line. And it shows in the STEM scores. Which ends up seeing Black students often steering away from STEM almost immediately.

Of course, it's not just the Black and African American communities that see these disparities, and have these barriers. But it's evident that this particular community does have a documented disadvantage.

So, what is NGA doing about it? Increasing diversity in STEM. We are looking everywhere for "What's Next" in our STEM outreach.

One location that I'd like to highlight is the city where we are building our new western headquarters, St. Louis, Missouri. Why is this important?

The community surrounding the new facility is a valued partner of NGA's. Kids today are seeing the building go up, and I hope they will want to be part of the future workforce.

We are going to be in St. Louis for a while, and are going to be neighbors, partners and collaborators, no matter what, based on geography alone, and the surrounding predominantly African American community is strong and capable. We would be remiss if we didn't make an effort to cultivate the amazing talent in this area – talent that comes from all walks of life – to help fill some of our positions, including STEM positions with very unique requirements.

Additionally, local community leaders also know that there will be an influx of STEM-based job opportunities being integrated into the DNA of that region. Jobs that are going to permanently exist and persist. So the community is well-positioned, and preparing for the growth of these STEM opportunities. So NGA and the community have a vested interest to work together to mentor and “coach up” the local talent.

And while it's not the only place or community where we are focusing our efforts, our STEM outreach in the St. Louis area and the surrounding communities naturally takes on an even greater emphasis, as we get closer to flipping on the lights in 2025, at our new facility in the Gateway City. So, prudently, NGA is teaming with community leaders in St. Louis to develop a pipeline of talent that will fuel the future of GEOINT in the years to come.

I also want to talk about how NGA is spending a lot of time growing relationships with key universities in the St. Louis region, in order to nurture that pipeline. Specifically, NGA has worked to become more involved at the university level in the growth of STEM-based curriculum development, with an end goal of increasing our geospatial-trained talent pool in our college-aged students.

To formalize this process, and grow that pipeline even more, NGA has developed Education Partnership Agreements (EPAs for short) to support the growth of this distinctive talent pool across St. Louis and its surrounding communities.

Today, we have formal agreements in place at Harris-Stowe State University and at the University of Missouri-St. Louis. This is a logical progression in the process – again, home-grown talent.

Harris-Stowe is a particular focus for our discussion today. Our EPA with them is the first one we've established with the specific focus of geospatial curriculum development. It's also one of our nation's HBCUs – Historically Black Colleges and Universities. We've been working with them to create a diversified portfolio of certificate programs based on GEOINT, to help prepare graduates for a career with NGA and its commercial partners.

Although still in development, these certificate programs are focused around an introduction to foundational geomatics, introduction to GEOINT, and GEOINT for Urban Planning. These courses will not only prepare Harris-Stowe students for multiple GEOINT-related fields, but begin the process of Harris-Stowe being able to provide future educators with the knowledge needed to be better prepared to teach geospatial-based content.

The EPA with University of Missouri-St. Louis, which is the most diverse campus in the University of Missouri system, was signed last fall; and while it too will focus on curriculum development, it's also designed to support and facilitate tours and demonstrations for students and faculty at unclassified facilities. It will also suggest research projects suitable for student participation, and could provide internship opportunities for students and sabbaticals for faculty members.

Here is what really matters: people are going to associate NGA with St. Louis. But when they think about St. Louis, they are going to think about STEM education and opportunities, too.

Bottom line, we all win when NGA and STEM are deep-rooted into the very DNA of St. Louis, but we complete the process when St. Louis's talent and culture are brought to NGA.

NGA has also established another line of growth for our GEOINT talent pipeline: Cooperative Research and Development Agreements, or CRADAs. We use CRADAs to collaborate with commercial companies, universities, and other non-Federal entities on joint Research and Development projects. CRADAs help both entities understand mutual needs and support exchange of innovative ideas and solutions.

One great example of a CRADA is right here at the University of Colorado Boulder. NGA and CU Boulder have established a CRADA to serve NGA's research needs. These include collaboration on methane gas detection, atmospheric profiling using Maxar's CAVIS data, sea ice monitoring, computer vision, visualization of electro-optical imagery in the non-visible regions, and space weather and space domain awareness.

So these tasks have started a relationship with CU Boulder, a level one research institution, to enhance solutions to relevant NGA research needs.

This CRADA also serves as a model to engage with the already well-established Colorado space and research community. In an effort to improve the relevance of the work to NGA, the CRADA even allows for limited classified work to be performed. It's a superb example of a collaboration that also works to build a region-specific pipeline for future GEOINT analysts, imagery analysts, data scientists, geodesy scientists, and all kinds of other STEM experts we need.

But it's not just St. Louis or Colorado where NGA is looking to grow geospatial STEM-talent.

NGA is deeply committed to Diversity, Equity, Inclusion, and Accessibility, and we have established an EPA with the nation's pre-eminent secondary institution for the Deaf and Hard of Hearing Community, Gallaudet University in Washington, D.C.

As a part of our EPA, NGA recently conducted a Virtual Recruitment Event with Gallaudet, where we gave students briefings on the NGA Persons with Disabilities Program, Workforce Recruitment Program, Student Programs, and Reasonable Accommodations.

And our Deaf and Hard of Hearing Council – one of several Special Emphasis Programs we have in place to promote Diversity, Equity, Inclusion, and Accessibility – conducted a panel with Gallaudet students, talking about their experiences as alumni and their work experiences at NGA.

To further broaden our push for STEM growth, we are searching across the neurodiverse and Autism spectrum as well. *CBS Morning News* recently aired a segment on our Neurodiverse Federal Workforce Pilot program. I hope you all had a chance to see it last Thursday.

For those of you who may not be aware, April is Autism Acceptance Month. And at NGA, we have come to understand that neurodiversity and being on the Autism spectrum is not only not a barrier to employment, but in some environments, a benefit or even an advantage. We now know that some people who are neurodiverse possess incredible attention to detail that allows them to process and analyze concepts, like patterns in imagery at an incredible – and for GEOINT purposes – useful rate.

One of our graduates from the Neurodiverse Federal Workforce Pilot who is now a full-time analyst with us was profiled in the story, and I was very fortunate to be able to speak to CBS about our work to support this effort at NGA.

Admiral Sharp is going to talk a little more about this tomorrow, but the goal is to create a template for recruiting neurodiverse talent for U.S. Federal Government agencies. We couldn't be happier to be a part of this process.

So, today, we put a lot out there.

STEM education is our lifeblood. And the better we are at identifying and supporting that talent at an early point along that journey, the better we all will be down the road.

The next generation of STEM leadership looks like America. And fell in love with math in the 5th grade. And is Black, brown, white, Asian, American Indian, female, and male. Hearing, and Deaf. Able, differently able, and neurodiverse. Straight and gay. From an inner city and a rural area.

As I said, they look like America. And I can't wait to see what they do next.

While I'm excited and laser focused on all of the things that NGA can bring to our future STEM leaders, what's even more important is what all of our future STEM leaders across America – with all of their diverse backgrounds and unique journeys – can bring to NGA.

And of course, it's on all of us to lead the charge in bringing STEM opportunities to all of our kids, who deserve the chance to bring innovation and creativity to the table.

To touch on another concept from Jennifer Ewbank's discussion earlier today that "We must never think about matching our adversaries in the digital landscape. We must aim to outpace them, keep moving, and keep innovating, so as to maintain a competitive advantage."

Well, the cat is out of the bag: growing our STEM pipeline through Diversity, Equality, Inclusion, and Accessibility is NGA's secret weapon. It's the advantage that puts us in position to win.

I'm going to leave you with some words of wisdom that have been attributed to several people in leadership roles, across many different walks of life. Theologians, teachers, authors – and even poets. Someone I greatly admire, Maya Angelou, once alluded to these words as well, and I want to offer up this piece of wisdom that I hope will inspire all of us to support the growth of STEM in all of our communities: Black, white, brown, gay, straight, abled, differently abled, rich or poor: "I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel."

I hope you remember some of what I said today. But more importantly, I hope that you will remember how you felt.

I'd love to take your questions, and if we don't get to all of them, please say hello if we run into each other over the next few days. I'll be on a morning panel tomorrow on the main stage, and I'll be at the NGA booth on Tuesday at 10.

Thank you very much. Now, let's turn this into a conversation.

###